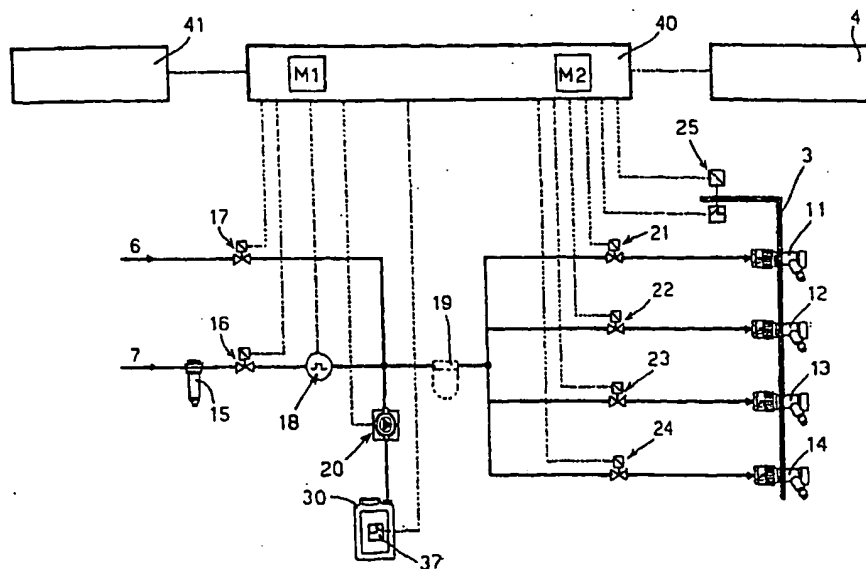




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : <b>B08B 9/032</b>	<b>A1</b>	(11) International Publication Number: <b>WO 00/53346</b> (43) International Publication Date: 14 September 2000 (14.09.00)
<p>(21) International Application Number: PCT/EP99/06427</p> <p>(22) International Filing Date: 1 September 1999 (01.09.99)</p> <p>(30) Priority Data: MI99A00490 11 March 1999 (11.03.99) IT</p> <p>(71) Applicant (for all designated States except US): DRINKATER- ING S.R.L. [IT/IT]; Via A. Volta, 9, I-20025 Legnano (IT).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): DALLE FRATTE, Luigi [IT/IT]; Via Arrigo Boito, 17, I-20025 Legnano (IT).</p> <p>(74) Agents: ROBBA, Pierpaolo et al.; Interpatent, Via Caboto, 35, I-10129 Torino (IT).</p>	<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>	

(54) Title: AN APPARATUS FOR SANITIZING DRINK DISPENSERS



## (57) Abstract

An apparatus for sanitizing drink dispensers and drink dispensing systems comprising a water inlet fitting (6), a gas inlet fitting (7), a tank of concentrated detergent, mixing means (19) connectable to said water inlet fitting (6), and a plurality of outlet fittings (11-14), each connectable to at least a machine or system for dispensing drinks or beverages, and provided with a solenoid valve. Programmable control means controls through solenoid valves the flow of water and/or gas, their mixing with the detergent and the delivery of the so formed mixture(s) through said outlet fittings (11-14), either in sequence or simultaneously.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

**BEST AVAILABLE COPY**

## AN APPARATUS FOR SANITIZING DRINK DISPENSERS

### Field of the Invention

5       The present invention relates to an apparatus for sanitizing machines and systems for dispensing drinks and beverages, and more particularly for washing the piping, the cooling coils and the inner devices of such machines and systems.

10       Drink dispensers and drink dispensing systems (usually defined as "on tap dispensers") can store and dispense large amounts of drinks, such as carbonated analcolic drinks, beer, wine, etc., at a controlled  
15       temperature, and the distance between the beverage containers or cans and the dispensing device can be large. The drinks can be of the type known as "pre-mix", i.e. a drink that is dispensed by the machine as it has been filled in the cans or drums by the producer, without any  
20       addition of water or other ingredients, or of the so-called "post-mix" type when a concentrated syrup is mixed with water, either carbonated or natural to obtain the drink.

25       By way of an example, Fig. 7 schematically shows a system for dispensing pre-mix drinks. The system comprises some cans 50-53 containing the drinks, a CO2 cylinder or bottle 54 connected to the cans via tubes or pipes 60a, b, c, d, a cooling machine 55 incorporating a separate vessel for each drink, each vessel being connected to the  
30       corresponding drink can via tubes or pipes 61a, b, c, d, and a dispensing device 58. The conduits 56 connecting the cooling machine 55 to the dispensing device are properly lagged.

35       A sanitizing operation or sanitation substantially comprises a (multiple cycles) wash of the conduits and the devices forming the drink dispenser or drink dispensing system, with suitable chemicals that removes from the conduits the deposits left by the drinks, while carrying  
40       out a disinfecting action to prevent bacterial growths.

### Background Art

45       The sanitizing of drinks dispensers and the like is manually carried out by skilled personnel at regular intervals. This causes additional considerable increase of the running costs for operating the machines, both due to the travelling expenses and the intervention cost, and to the long downtimes of the dispensers since the operation

has usually to be carried out at times when the machines should be operating.

### Object of the Invention

5 It is therefore an object of the present invention to overcome the above mentioned drawbacks and limitations of the prior art, and more particularly to provide an apparatus for sanitizing drink dispensers that  
10 is simple to use by unskilled workers, and that ensures a thorough and effective sanitizing washing.

The invention achieves the above objects through an apparatus for sanitizing drink dispensers and drink  
15 dispensing systems as claimed in claim 1. Additional advantageous features are the objects of the depending claims.

By employing an apparatus according to the invention a  
20 person with only a minimal knowledge of the systems, such as for example the machine operator or the warehauser, is enabled to carry out the sanitizing of a dispenser or a dispensing system without difficulties and without risks.

25 This way the intervention of skilled personnel from outside is avoided, and the treatment is rendered more rapid and efficient.

The apparatus is further adapted to be programmed to  
30 comply with the requirements and the constructions of machines and systems of different types.

### Disclosure of the Invention

35 The invention will now be disclosed with reference to the attached drawings illustrating preferred but non-limiting embodiments of the invention, in which:

### Brief Description of the Drawings

40 Fig. 1 is a perspective view of the front part of an apparatus according to the invention;

45 Fig. 2 is a perspective view of the rear part of an apparatus according to the invention;

Fig. 3 is a block diagram of a first embodiment of the apparatus according to the invention;

50 Figures 4 and 5 are block diagrams of a second and a third embodiment of the invention, respectively;

BEST AVAILABLE COPY

Fig. 6 is a time chart illustrating a washing cycle of the apparatus of Fig. 3;

5 Fig. 7, already briefly discussed, schematically illustrates a system for dispensing pre-mix drinks; and

10 Fig. 8 schematically illustrates the connection between the system of Fig. 7 and an apparatus according to the invention.

Throughout all the Figures the same numeral references have been used to indicate the same or substantially equivalent components.

15

#### Detailed Description of Preferred Embodiments

20 With reference to Figures 1 and 2, an apparatus according to the invention is received in a metal case or housing 1 provided with outlet fittings or ports 11, 12, 13 and 14 (preferably equipped with valve means). Each fitting can be connected to at least one line of the drink dispensing system, and to this aim each fitting is equipped with a rapid connection device or head. In the illustrated 25 embodiments there are shown four outlet fittings, however there could be provided more fittings than those shown, or even less than four fittings (with a minimum of one). On the same side of the housing 1 carrying the above fittings there are mounted a block bar 3 that will be disclosed in detail later, and a control and display panel 4. 30

On the opposite side (i.e. the rear one) there are provided a water inlet fitting 6 and an inlet fitting 7 for a gas, for example CO<sub>2</sub> or N<sub>2</sub> or a mixture thereof, to be 35 connected to one or more gas sources (such as bottles, cylinders or reservoirs not shown in the drawings). These gases are usually available in any dispensing system. On the rear panel there are further located a power supply switch 8 and a power supply plug for the electrical 40 feeding, typically from a 220 V A.C.

With reference now to the block diagram of Fig. 3, the construction of an apparatus according to the invention will be disclosed in detail.

45

The apparatus comprises a tank or reservoir of a concentrated detergent that can be connected via a pump 20 to a mixer 19, and is provided with a level sensor 37. The mixer 19 is in turn connected to four tubes or conduits. 50 The other end of each tube is connected to one of the outlet fittings 11-14, with a control device such as a

solenoid valve 21, 22, 23 and 24 inserted in each tube. Each valve 21-24 is independently controlled by programmable control means, schematically represented by an electronic control unit 40, e.g. programmable by inserting proper electronic cards into slots of unit 40.

The control and display panel 4 is connected to the unit 40, and an external programmer 41 can be connected to such unit.

In the embodiment illustrated in Fig. 3, the fitting 6 for the inlet of water and the fitting 7 for the inlet of a gas are connected to the inlet of mixer 19 through respective solenoid valves 16 and 17 controlled by the unit 40. Moreover, along the tube connecting the water fitting 6 and the mixer 19 there are inserted, respectively upwardly and downwardly of the solenoid valve 16, a mechanical filter 15 and a. The signal output of the flowmeter 18 is connected to the unit 40 for supplying information about the flow rate of the water being fed to the mixer.

It is stressed that the mixer 19 needs not to be formed as a discrete component, since a mixing of the water and the gas can be accomplished in different ways, such as in tube sections having properly enlarged and/or restricted cross-sections. For this reason the mixer 19 is shown in dashed lines in Fig. 3.

The unit 40 operates in accordance with one or more programs included in such unit, typically programs written in a memory M1 by an external programming device 41 adapted to insert and/or modify the washing data/parameters and the instructions. Unit 40 contains an additional memory M2 for recording the events, that can be read out through the same device 41, in order to verify the proper operation of the apparatus and/or the washing cycle, and in case to trace possible malfunctions.

According to the invention, a blocking arrangement is provided for the fittings 11-14 and comprises a bar 3 actuated by an electromagnet 25 under commands from unit 40 to allow the fitting disengagement only at the end of the cycle, thus preventing the fortuitous or wrong interruption of the cycle by an accidental disengagement of the fittings. A similar block is caused also by a mains breakdown and in this latter situation, since the current phase of the cycle is stored (in 40), the cycle is correctly resumed when the feeding is restored.

As shown in Fig. 8, the apparatus according to the invention is connected to a dispensing system such as the

BEST AVAILABLE COPY

one illustrated in Fig. 7. More particularly, the fitting 7 for gas inlet is connected to the CO2 cylinder 54, while the fitting 6 for water inlet is connected to a (not shown) water intake or tap of the water system. The four outlet fittings 11-14 are connected to the tubes 60a, b, c, d after these latter have been disconnected from the respective cans and a device 57 for draining the liquids is properly connected to the dispensing device 58.

The operation of the apparatus according to the invention will now be disclosed. After the dispensing machine has been switched off and the system has been disconnected from the drinks cans, and the fittings 6 and 7 have been connected to suitable supplies of water and gas, and the fittings 11-14 have been connected to the dispenser to be sanitized, for example as shown in Fig. 8, in order to start the washing cycle, the following requirements are to be met:

1. the detergent is present in the tank as detected by the sensor 37;
2. block bar 3 is in a lowered (safety) position;
3. no alarm has been activated.

When all the above conditions are met, by pushing a start button in the control panel, a cycle is started and automatically carried out.

At the start, the sanitizing cycle starts with a CO2 prewashing by activating (energizing) the main solenoid valve 16 and the solenoid valve 21 connected to the outlet fitting 11. The flowing water actuates the flowmeter 18 that in turn forwards to the unit 40 a signal representative of the flow rate. As a consequence the control unit 40 drives the pump 20 to draw an amount of detergent proportional to the water flow and in accordance with the programmed characteristics of the cycle.

The detergent injected by the pump into the circuit forms with the water a cleansing and sanitizing solution that is properly blended in mixer 19 and reaches the flowmeter 21 of the first outlet 11. The flowmeter 21 transfers to the unit 40 information about the flow rate effectively coming out from the outlet 11. If a gas is provided for in the solution, also the solenoid valve 17 will be actuated. Only after a predetermined amount of solution has been delivered the apparatus switches to the next cycle phase or the next cycle. At the end of the cycle the fitting block bar is disengaged.

50

For each outlet fitting (line or valve), the apparatus can perform a programmable cycle, for example the one listed hereinbelow and illustrated in Fig. 6.

- 5       Prewashing with CO2
- Prewashing
- Pause duration 1
- Washing with CO2
- Washing
- 10       Pause duration 2
- Rinse
- Emptying with CO2

- 15       where all the phases are programmable in respect of the flow or the duration, with different values for each outlet.

- 20       To ensure a more effective removal of organic residues that can possibly be present in the pipes and in the components in contact with the beverages, the cycle is advantageously made up of different phases. The first phase provides for a prewashing with CO2 in order to remove the bulk of the residues by exploiting the chemical action of the cleansing solution together with the mechanical action
- 25       exerted by the gas injected. The gas is injected for times and at pressures in accordance with the specific system to be sanitized, through the pressure reducer already present in the system. The subsequent prewashing without CO2 aims to prepare the system to the first pause. This phase allows
- 30       to remove from the pipes gas bubbles that could form in the pipes and could hinder the action of the cleansing and sanitizing solution occurring during the first pause. In fact during this pause the first resistant layer of residues is attacked, and it is later removed in the
- 35       subsequent washing phase with CO2, that serves to prepare the system to the second pause during which the inner surfaces of the pipes - already almost completely cleaned - are subjected to an effective sanitizing action by the solution.

- 40       After the predetermined time for the second pause has elapsed, the cycle proceeds with the rinsing phase with flowing water to remove the sanitizing solution from the system. The subsequent emptying of the tubes with CO2
- 45       removes from the pipes any remaining water. The system of the dispensing machine is now ready to be reconnected to the beverage cans and then the dispenser is started.

- 50       Thanks to the above disclosed apparatus, it is achieved a simultaneous sanitizing preventing the forming of bacterial proliferation.

BEST AVAILABLE COPY



In the embodiment illustrated in Fig. 4, the phases of the cycle are carried out in sequence on a single outlet (11-14) one at a time.

5

The embodiment of the apparatus illustrated in Fig. 4 is adapted to sequentially carry out the phases of a cycle on two outlets (11-14) at a time. In such apparatus, the outlet fittings 11-14 are connected together in couples, upwardly of the respective solenoid valves 21-24 and of the CO<sub>2</sub> inlet fitting 7, and downwardly of the associated solenoid valve 17. Moreover, a flowmeter 35 is inserted between the mixer 19 and the common connection point of outlets 11 and 12, and a flowmeter 36 is inserted between the mixer 19 and the common connection point of outlets 13 and 14, such flowmeters inputting the respective flow information to the unit 40.

10

15

In the embodiment illustrated in Fig. 5, the phases of the cycle are carried out simultaneously at all the four outlets (11-14). In such apparatus, the CO<sub>2</sub> inlet fitting 7 is directly connected to each one of the outlet fittings 11-14, upwardly of the respective solenoid valves 21-24. There are further provided flowmeters 31-34, each connected between the mixer 19 and one solenoid valve 21-24 of the outlet fittings 11-14, these flowmeters being connected to the programmable control means 40 for independently adjusting the flow rate of the mixture delivered from each outlet fitting 11-14.

20

25

30

The basic structure of the apparatus according to the invention allows for easily obtaining several arrangements differing from one another by the outlet numbers, the number of flowmeters in the outlet tubes, etc. Thus it is possible to obtain a large flexibility with a cost and a performance of the apparatus that precisely comply with the system or machine to be sanitized.

35

Although the invention has been illustrated with particular reference to preferred embodiments thereof, it is generally susceptible of other applications and modifications that fall within the scope of the invention, as will be evident to the skilled of the art.

40

BEST AVAILABLE COPY

## CLAIMS

1. An apparatus for sanitizing drink dispensers and  
5 drink dispensing systems, characterized by comprising in  
combination:  
a water inlet fitting (6)  
a tank of a concentrated detergent;  
mixing means (19) that can be connected to said water  
10 inlet fitting (6);  
a pump (20) connected between said tank (30) and said  
mixing means (19);  
a plurality of outlet fittings (11-14), each of said  
fitting being adapted to be connected to at least one  
15 machine or system for dispensing drinks, and provided with  
a solenoid valve;  
a gas inlet fitting (7) that can be connected to said  
outlet fittings (11-14);  
programmable control means (40) for controlling  
20 through solenoid valves the water and/or gas flow, their  
mixing with said detergent and the delivery of the  
resulting mixture(s) through at least one of said outlet  
fittings (11-14).
- 25 2. A sanitizing apparatus as claimed in claim 1,  
characterized in that a solenoid valve (16, 17) actuated by  
said programmable control means (40) is provided upwardly  
of each inlet fittings (6,7).
- 30 3. A sanitizing apparatus as claimed in claim 1 or 2,  
characterized by providing a flowmeter (18) connected  
between the solenoid valve (16) applied to said water inlet  
fitting (6) and said mixing means (19), the signal output  
of said flowmeter (18) being connected to said programmable  
35 control means (40) for regulating the mixing amounts of  
said water and concentrated detergent.
4. A sanitizing apparatus as claimed in claim 1, 2 or  
3, characterized in that said mixing means comprises a  
40 mixer (19).
5. A sanitizing apparatus as claimed in claims 1 to 4,  
characterized in that said gas inlet fitting (7) is  
directly connected to said mixer (19) and that each of said  
45 outlet fittings (11-14) is connected to said mixer (19).
6. A sanitizing apparatus as claimed in claims 1 to 4,  
characterized in that said outlet fittings (11-14) are  
connected together in couples, upwardly of the respective  
50 solenoid valves (21-24), and the common connection point of  
the couples of outlet fittings are further connected to

BEST AVAILABLE COPY

said gas inlet fitting downwardly of its solenoid valve (17).

5 7. A sanitizing apparatus as claimed in claim 6, characterized by providing a flowmeter (35, 36) inserted between said mixer (19) and each of the common connection points of said couples of outlet fittings.

10 8. A sanitizing apparatus as claimed in claims 1 to 4, characterized in that said gas inlet fitting (7) is directly connected to each outlet fitting (11-14), upwardly of the respective solenoid valve (21-24).

15 9. A sanitizing apparatus as claimed in claim 8, characterized by providing a flowmeter (31-34) connected between said mixer (19) and each outlet fitting (11-14), each of said flowmeters being connected to said programmable control means (40) for independently adjusting the flow rate of the mixture delivered by each outlet  
20 fitting (11-14).

10. A sanitizing apparatus as claimed in the preceding claims, characterized in that said programmable control means (40) comprise a microprocessor unit with a reading  
25 memory (M1) storing the programs and a write memory (M2) for storing operating data and events.

11. A sanitizing apparatus as claimed in the preceding claims, characterized in that said gas is selected between  
30 CO<sub>2</sub>, N<sub>2</sub> and mixtures thereof.

12. A sanitizing apparatus as claimed in the preceding claims, characterized in that said outlet fittings (11-14) are equipped with rapid connection heads for connecting to  
35 pipes or tubes (60a, b, c, d) of the machine or system to sanitize.

13. A sanitizing apparatus as claimed in the preceding claims, characterized by providing a block bar (3),  
40 actuated by an electromagnet (25) under control of said control unit (40), for preventing the disengagement of said fittings (11-14)

14. A sanitizing apparatus as claimed in the preceding  
45 claims, characterized in that all said solenoid valves at said outlet fittings (11-14) are opened simultaneously.

15. A sanitizing apparatus as claimed in claims 1-14  
50 characterized in that at least two solenoid valves at said outlet fittings (11-14) are opened in sequence.

BEST AVAILABLE COPY

1 / 4

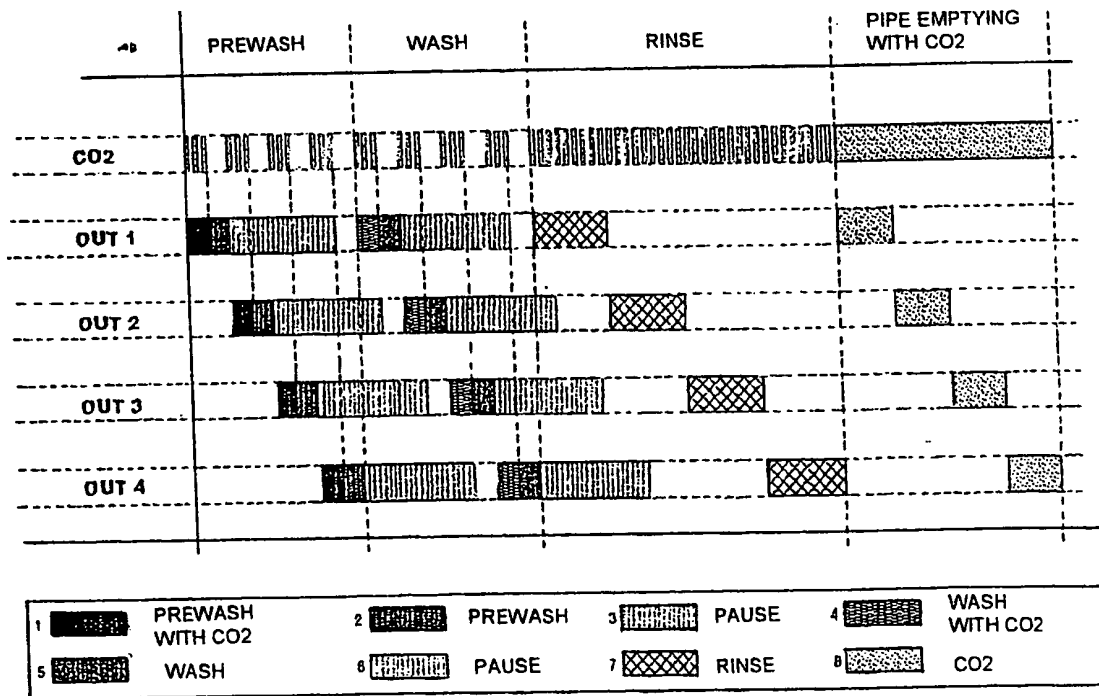
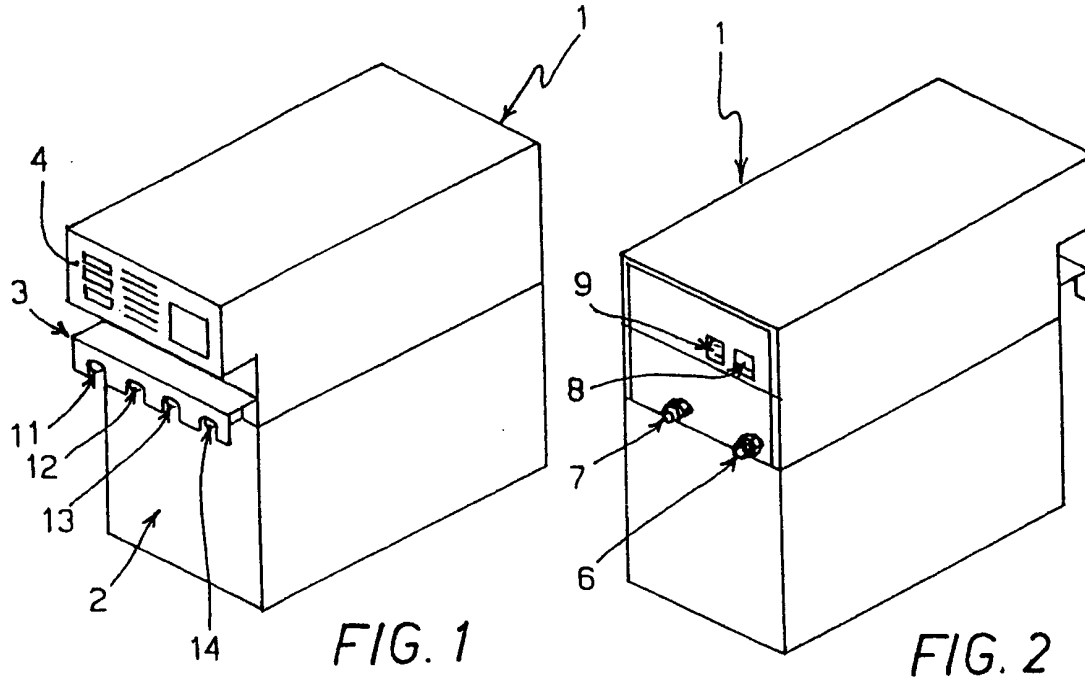


FIG. 6

BEST AVAILABLE COPY

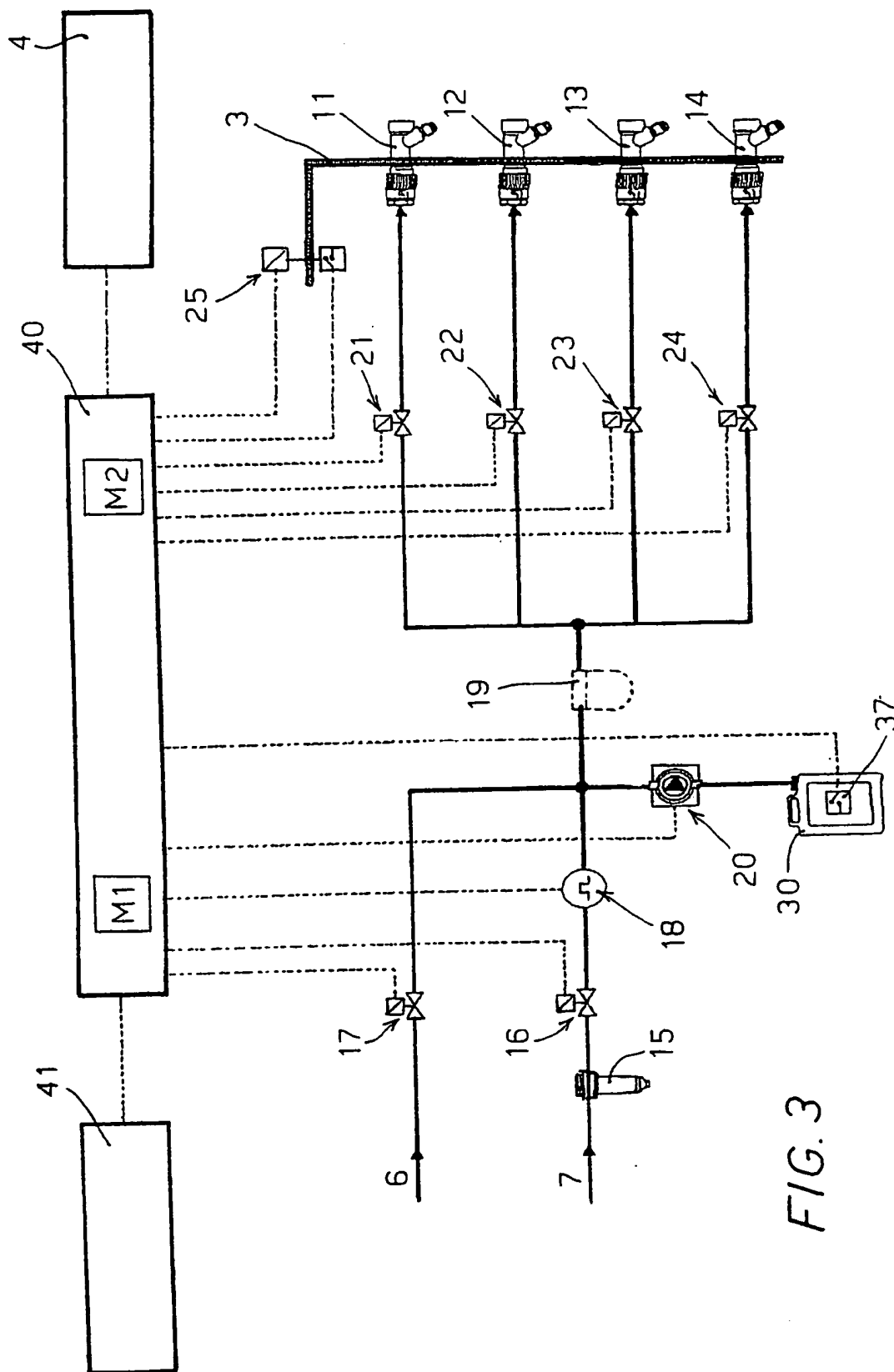


FIG. 3

BEST AVAILABLE COPY

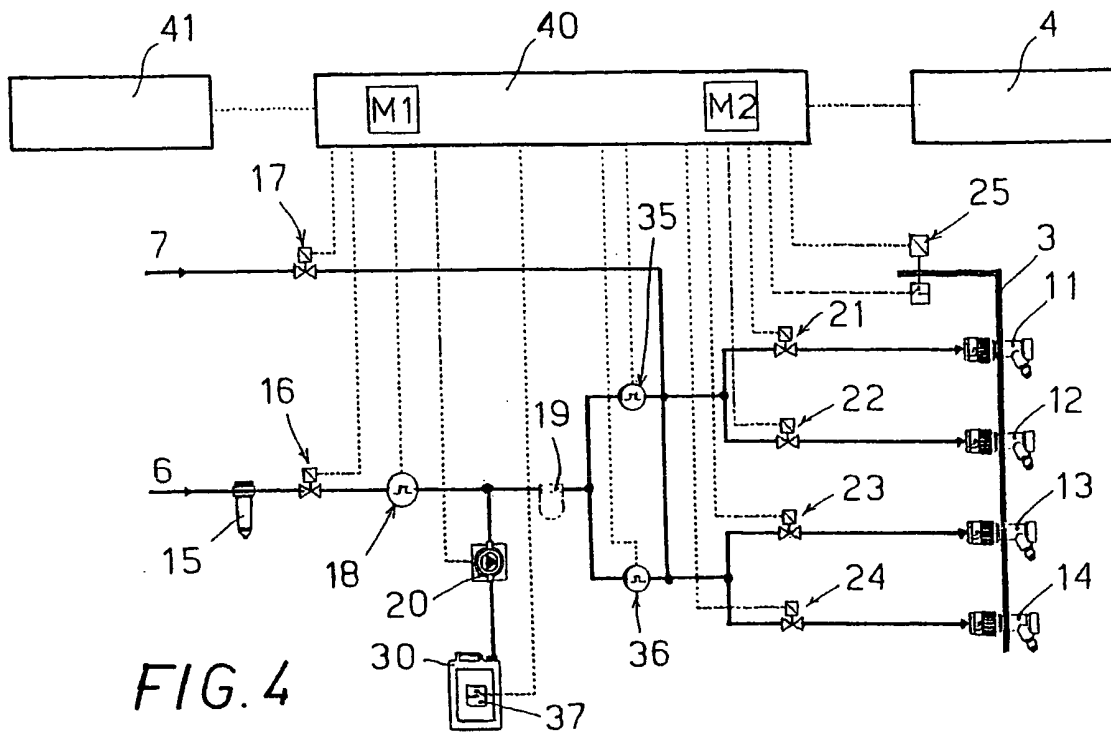


FIG. 4

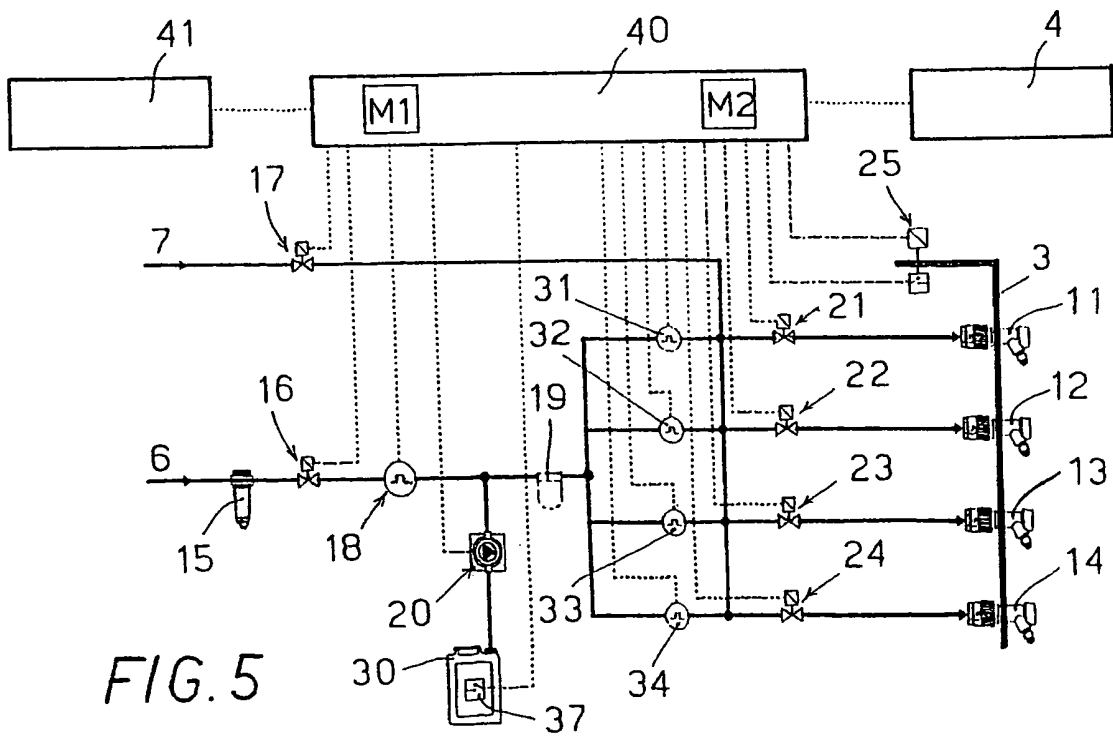


FIG. 5

FIG. 7

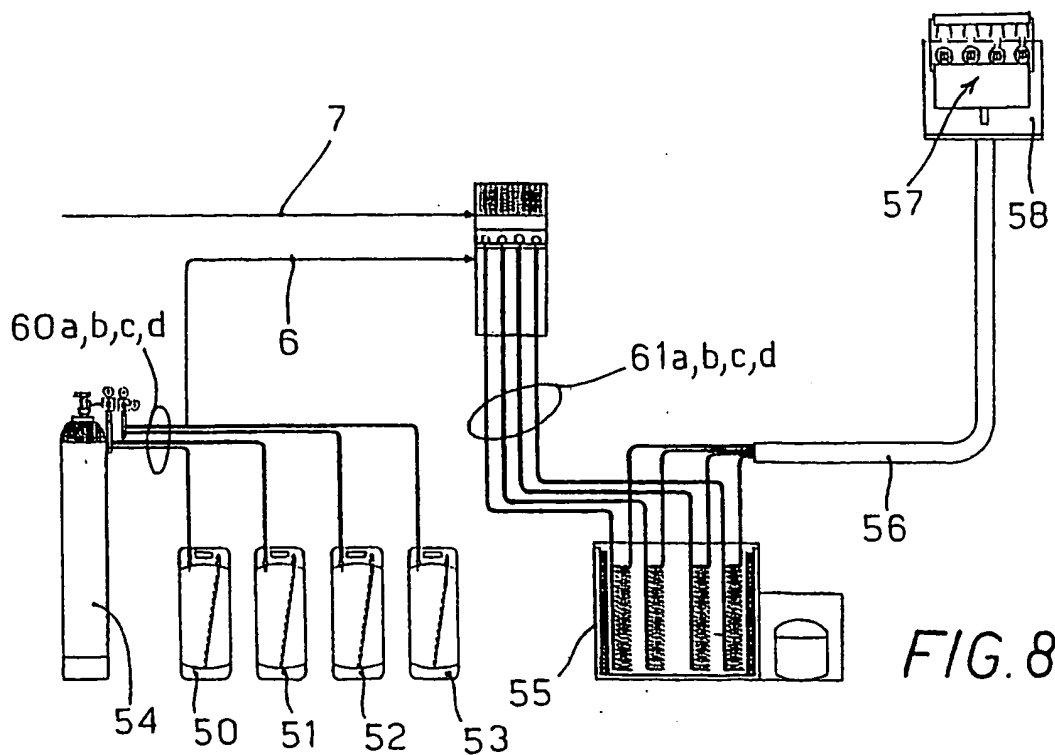
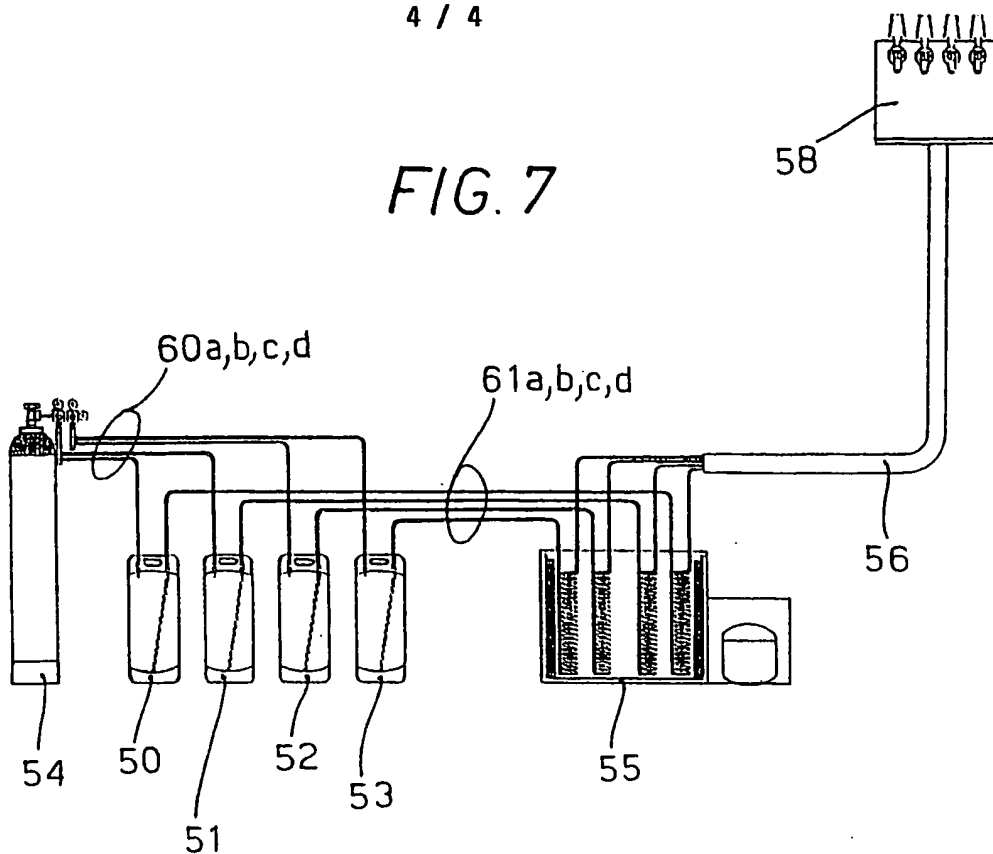


FIG. 8

BEST AVAILABLE COPY

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 99/06427

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B08B9/032

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B08B B67D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 40 25 624 A (F. MALDONADO) 14 February 1991 (1991-02-14) column 2, line 2 -column 3, line 60 column 4, line 30 -column 5, line 7	1-5,8, 10-12,14
A	figures 1,2	13,15
X	EP 0 487 214 A (COMMONWEALTH IND. GASES) 27 May 1992 (1992-05-27) page 1, line 48 -page 2, line 55 figure 1	1,2,4, 11,14
A	US 5 762 096 A (P.J. MIRABILE) 9 June 1998 (1998-06-09) column 3, line 60 -column 7, line 41 figures	1-4,10, 12
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

17 December 1999

Date of mailing of the international search report

12/01/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Leitner, J



# INTERNATIONAL SEARCH REPORT

Inte. l.ional Application No

PCT/EP 99/06427

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 572 230 A (P.J. MIRABILE) 25 February 1986 (1986-02-25) abstract; figures 1-3 -----	1,6

BEST AVAILABLE COPY

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 99/06427

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4025624 A	14-02-1991	NL 8902052 A	01-03-1991
EP 487214 A	27-05-1992	AU 637484 B	27-05-1993
		AU 7526991 A	11-06-1992
		CA 2055754 A	20-05-1992
		NZ 240559 A	26-08-1993
US 5762096 A	09-06-1998	NONE	
US 4572230 A	25-02-1986	US 4527585 A	09-07-1985
		FR 2570965 A	04-04-1986
		IT 1185211 B	04-11-1987
		JP 61093094 A	12-05-1986
		AU 561712 B	14-05-1987
		AU 2975084 A	03-01-1985
		CA 1226408 A	08-09-1987
		DE 3422987 A	03-01-1985
		GB 2142112 A, B	09-01-1985